



***DARPA*Tech**

2002 Symposium

Transforming
Fantasy



**LTCOL Gregory
Vansuch, USAF**
Program Manager





Navigation & Guidance

Lt Col Gregory Vansuch, USAF
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703-248-1547



Navigation & Guidance

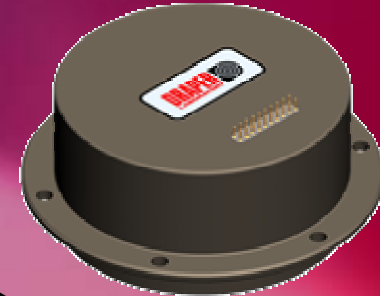
GPX

- ▶ High power GPS signals



MEMS INS

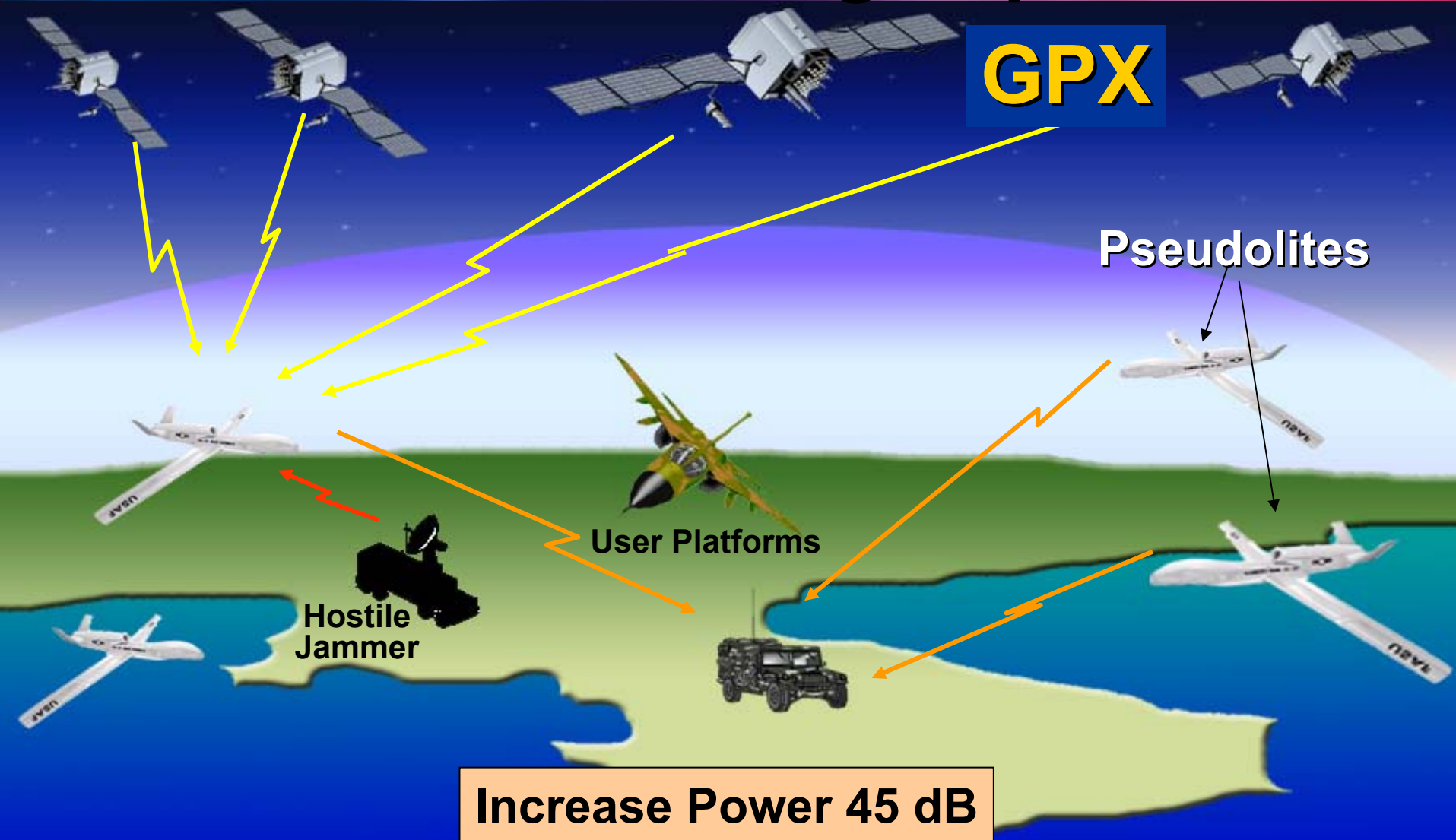
- ▶ Low cost inertial sensors



New Initiatives

- ▶ Man-portable navigation
- ▶ Urban/indoor navigation
- ▶ Inertial navigation <1 deg/hr

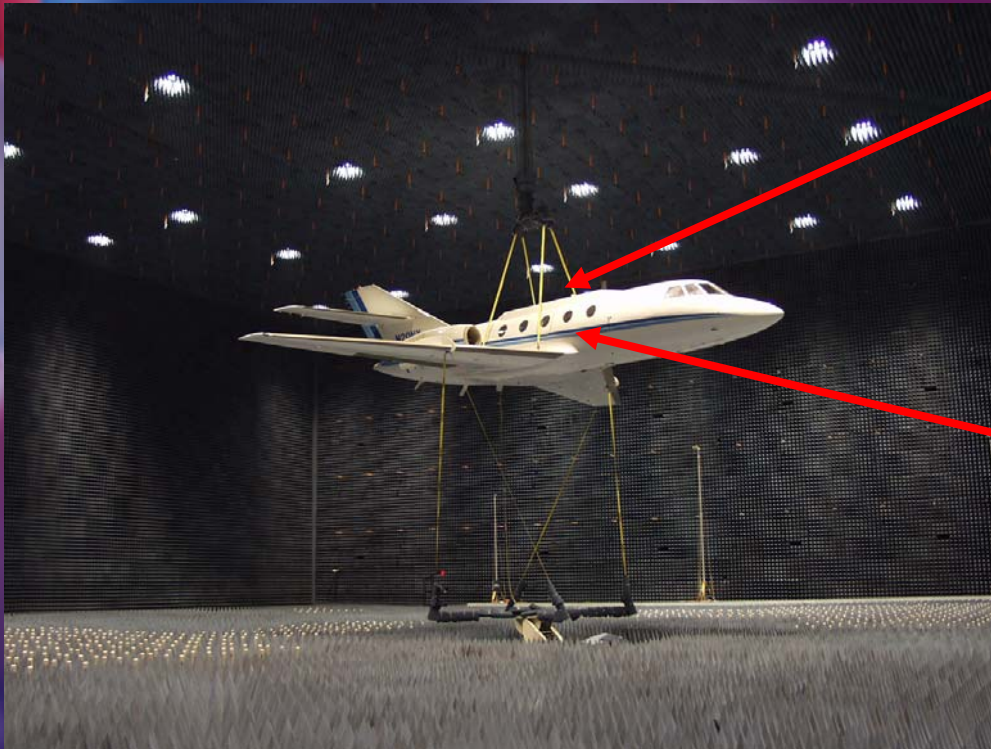
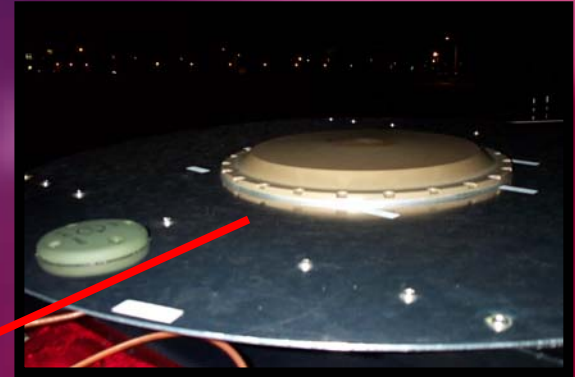
Global Positioning Experiments



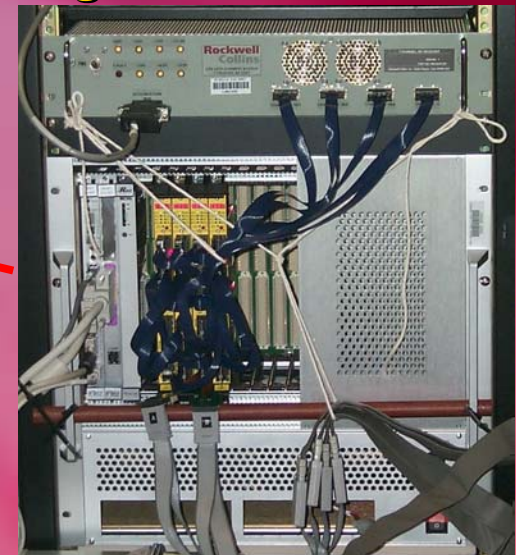
Digital Beamformer

7 Element Antenna

- Full scale jamming tests in chamber
- Pseudolite protected by 40-55 dB



Digital Beamformer



GPX Testing

1999

2000

2001

2002

2003

**Navigation
Accuracy**



**Burn Through
Jamming**



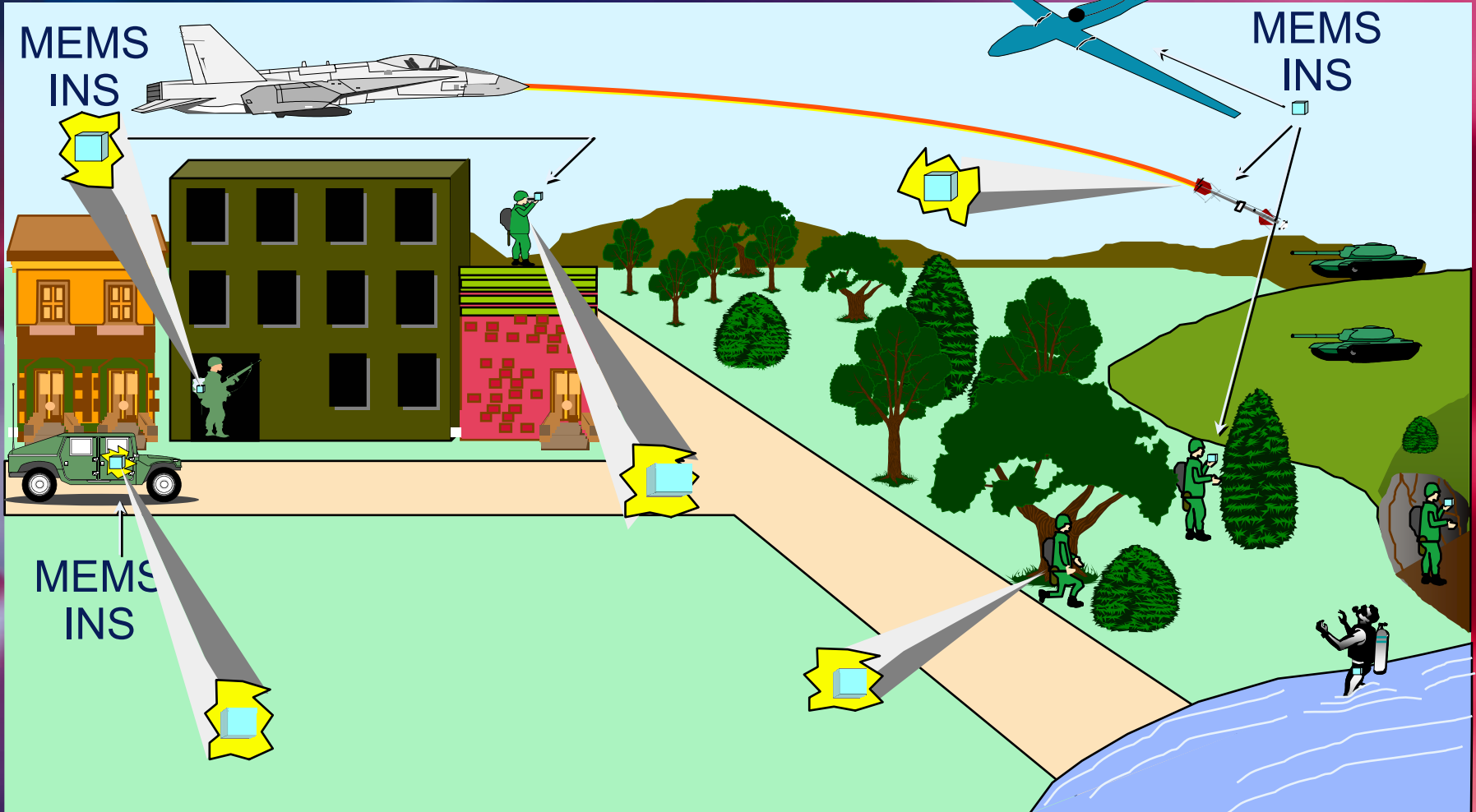
**Beamformer
Antijam**



**Full Pseudolite
System**



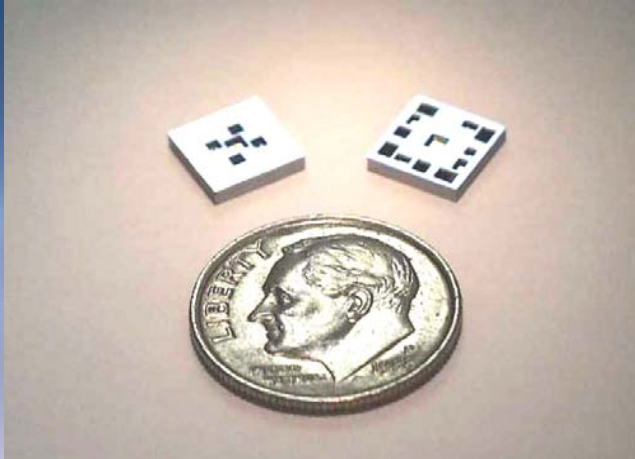
MEMS INS



Tactical Grade MEMS INS

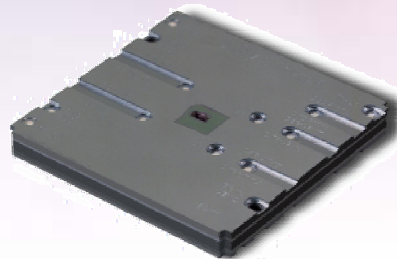
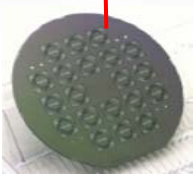
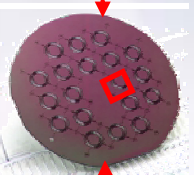
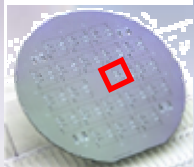
- 1.0° to 10° /hr Gyro Drift Rate
- <500 mg Accelerometer Bias
- Temperature Range: -54 to 85°C
- Low Power <3 Watts
- Small Size: <10 cu inch

MEMS Gyroscope

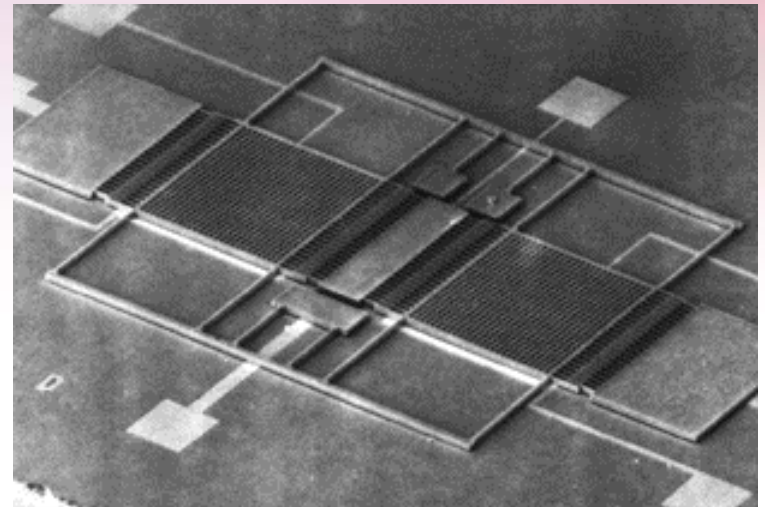


**KEARFOTT-
Micromachined Vibrating
Beam Multisensor**

DRAPER - Tuning Fork Gyro

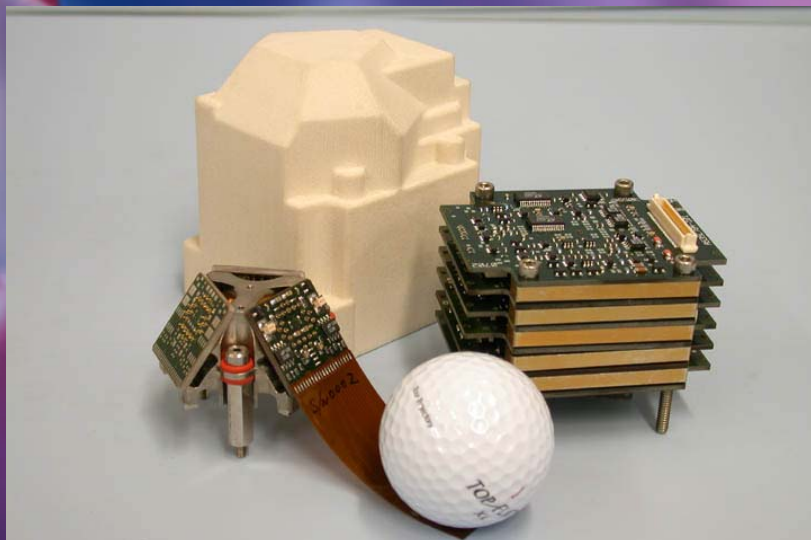


LITTON - Silicon Gyro



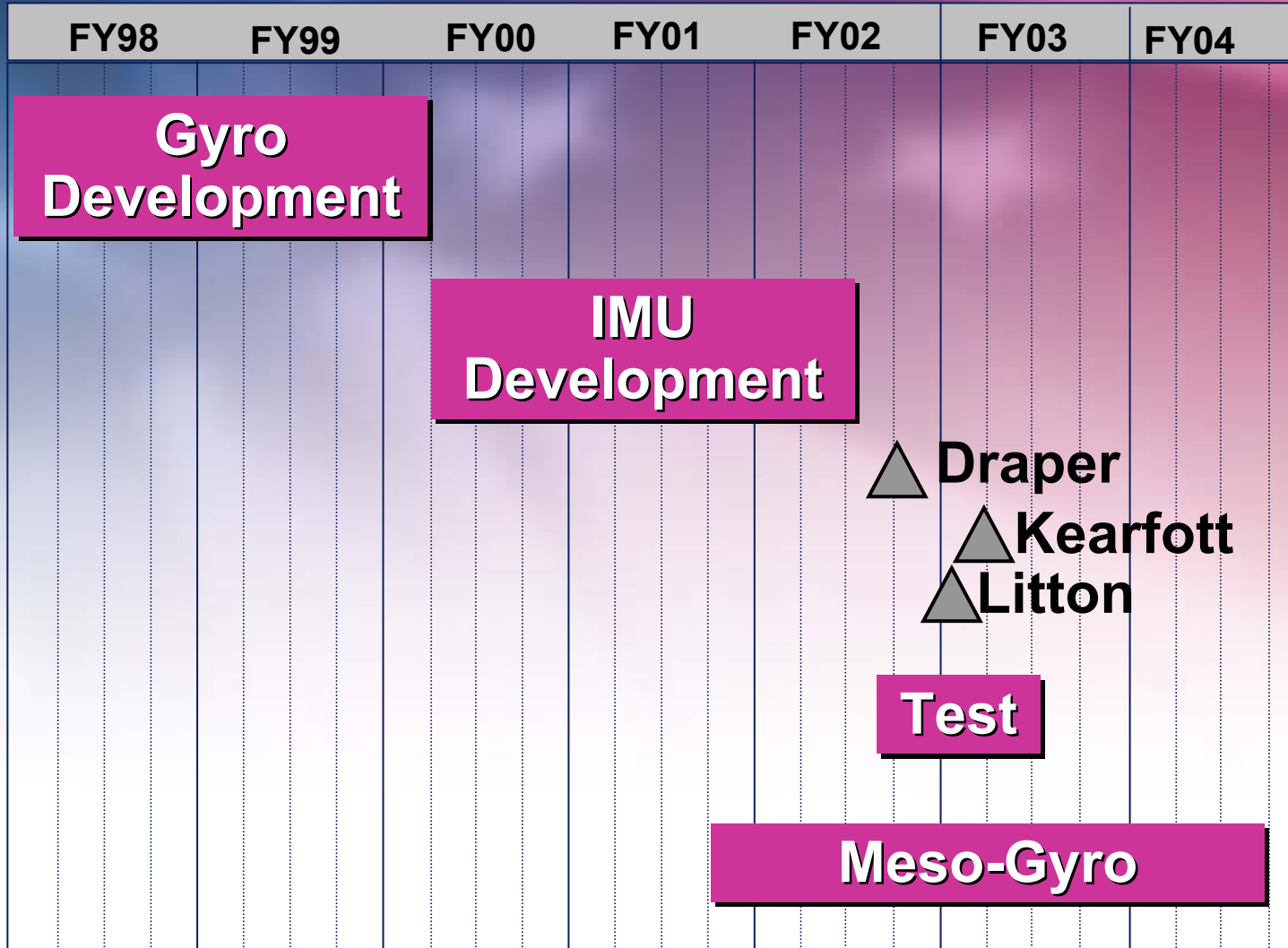
MEMS-based Inertial Measurement Units

Draper Laboratory



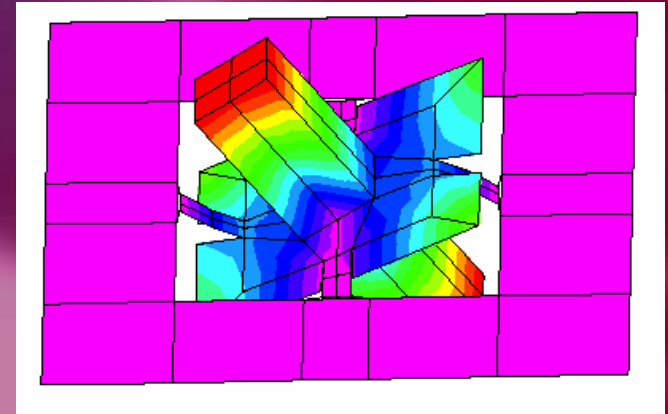
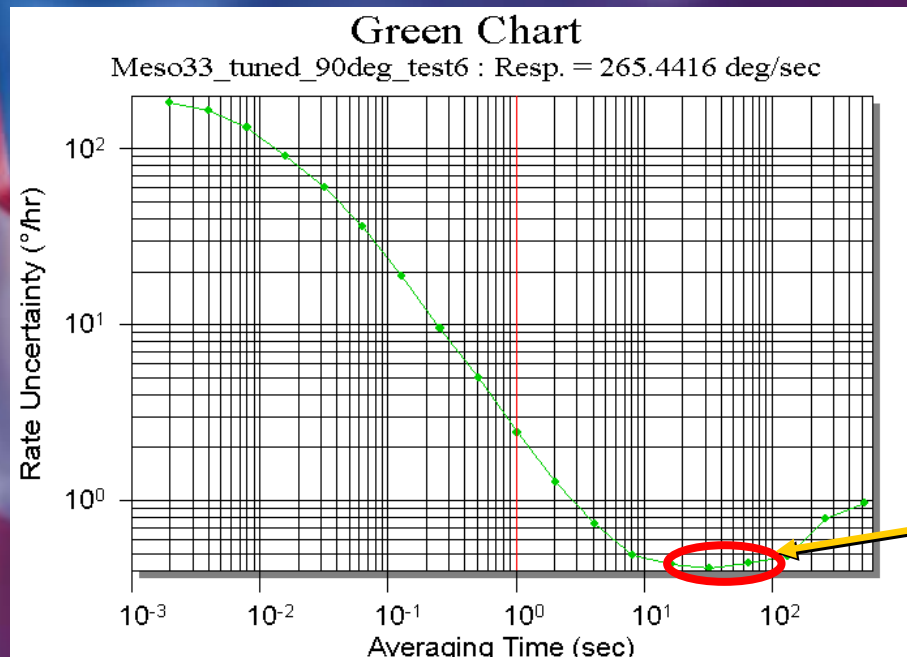
**Kearfott Guidance
& Navigation**

MEMS-INS Schedule



Meso-Gyroscope

- Meso-scale gyroscope offers more accuracy at slight increase of size and cost

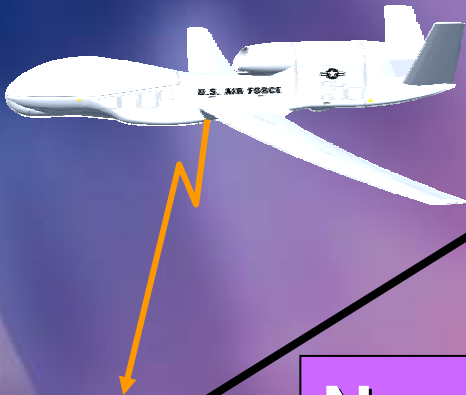


0.4 deg/hr

Navigation & Guidance

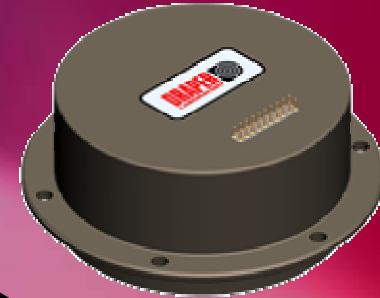
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